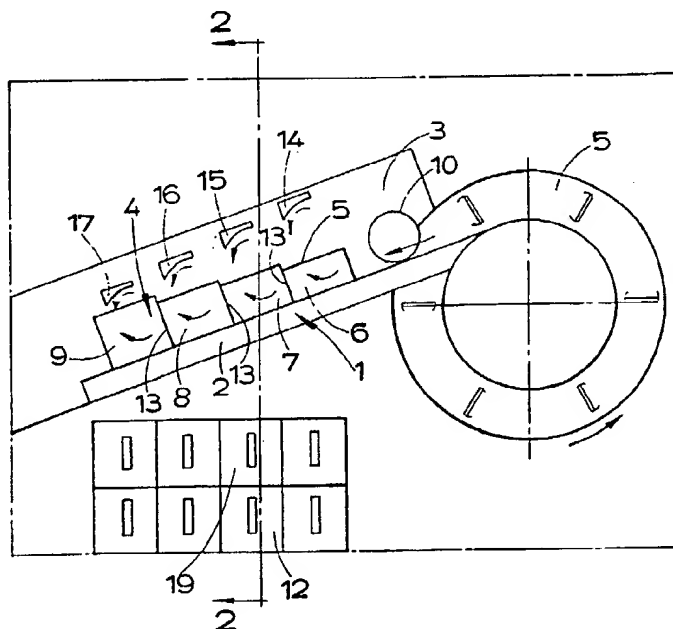




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁴ : G07D 3/12, 3/04	A1	(11) International Publication Number: WO 88/ 08174 (43) International Publication Date: 20 October 1988 (20.10.88)
(21) International Application Number: PCT/GB88/00274 (22) International Filing Date: 8 April 1988 (08.04.88) (31) Priority Application Number: 8708555 (32) Priority Date: 9 April 1987 (09.04.87) (33) Priority Country: GB (71) Applicant (for all designated States except US): SCAN COIN AB [SE/SE]; Jagershillgatan 26, S-213 75 Malmo (SE). (72) Inventor; and (75) Inventor/Applicant (for US only) : GOH, David [GB/GB]; Grange Farm, Stirchley Road, Stirchley, Shropshire, Telford TF1 1AA (GB). (74) Agent: BARKER, BRETTELL & DUNCAN; 138 Hagley Road, Edgbaston, Birmingham B16 9PW (GB).		(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, SE (European patent), US. Published <i>With international search report.</i>

(54) Title: COIN SORTERS**(57) Abstract**

In a coin sorter of the inclined ramp type the inclined ramp has the usual support surface (2) along which the edges of the coins roll, and the usual coin face support surface (3). The support surface (3) is provided both with apertures (6, 7, 8, 9) of progressively increasing size going down the ramp, for coins of the appropriate size to fall through, and with a set of peeler knives (14, 15, 16, 17) at varying distances from the edge support surface (2) for tipping other coins, according to their size, from the ramp. This arrangement facilitates a much shorter ramp, and thereby a more compact machine.

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COIN SORTERS

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5 This invention relates to a coin sorter of the kind in which mixed coins pass on edge down an inclined ramp and are subjected to a series of tests which are used to sort the coins.

The term "coin" will be used herein to include a token or bogus coin.

10 In a common type of such machine the coins roll down the ramp with their rear faces supported by an elongate support surface which is provided with an elongate slot of stepped outline, the slot becoming
15 vertically wider towards the lower end of the ramp. Depending upon the diameter of a coin it will fall through the slot in the support surface at a smaller or greater distance down the ramp. For each portion of the slot of a particular width, a coin collection chute
20 is provided for directing the coins which fall through that portion of the slot to a respective open-topped coin collection box or drawer. Reject coins, which may be detected in various ways are dealt with in a different manner.

25 When it is required to sort a large number of different coin denominations it is accordingly necessary to provide a corresponding number of coin collection boxes which are arranged in a line beneath
30 the ramp. The long length of the ramp and line of coin boxes leads to a very bulky machine.

35 In other such machines it is known to provide, instead of a stepped coin slot, a series of longitudinally spaced "peeler knives" which are arranged at different distances from the ramp surface

along which the coins roll, and which selectively topple the coins from the ramp at different positions along the ramp in dependence upon coin diameter by engaging with the tops of coins of the appropriate diameters. Again, however, the ramp needs to be long to sort a large number of different coin types.

We have realised that it would be possible and advantageous to provide both peeler knives and slots.

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According to the invention we provide a coin sorter of the kind comprising a ramp which is adapted to be inclined in use and to be fed at its upper end with coins of mixed types such that the coins proceed on edge down a coin edge support surface of the ramp, in which the ramp is provided with a coin face support surface for supporting one face of the coins as the coins proceed down the ramp, the coin face support surface being provided with aperture means comprising aperture portions of different widths in the direction normal to the direction of the coin edge support surface, the widths increasing towards the lower end of the ramp whereby some coins, depending on their diameters in relation to the transverse dimensions of the aperture portions, will fall through the corresponding aperture portions, the ramp also comprising a plurality of coin deflecting members spaced apart along the ramp and located at different distances from the coin edge support surface, the distances decreasing in the direction from the upper end of the ramp to the lower end of the ramp, the coin deflecting members being so arranged that some coins, in dependence on their diameter, engage with the corresponding deflecting member and are deflected away from the coin face support surface to fall from the ramp.

Since the coin sorter uses both the mechanism of allowing coins to fall backwards through appropriate portions of an aperture and the mechanism of deflecting coins forwardly off the ramp by suitably positioned deflecting members, it is possible to shorten the ramp considerably.

The invention also facilitates a much more compact layout of the coin collection boxes. Essentially, the chutes into which the coins fall may be arranged in an array of two rows rather than in a single line as with the known sorters of this type.

In a preferred arrangement of the coin collection boxes, an upper line of boxes is arranged such that the fronts of the boxes are arranged in line above the fronts of the boxes in a lower line of boxes, the boxes of the lower line being of greater depth than those of the upper line of boxes, in the horizontal direction normal to the box fronts, whereby the lower boxes collect the coins which have fallen through the aperture means, and the upper boxes collect the coins which have been displaced from the ramp by the deflecting members, or vice versa if desired.

Each box in the lower line is preferably arranged directly below a box in the upper line, but if desired they could be staggered. As usual the boxes are preferably removable by sliding them forwards.

The ramp is preferably fed with coins by a hopper type of coin feeder. That is, a coin feeder of the type comprising an inclined disc with pockets around its periphery for picking out coins one by one from a batch of coins inserted into the hopper.

It will, of course, be necessary to arrange the coin deflecting members in the correct order in relation to the transverse dimensions of the aperture portions.

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The aperture portions could be independent apertures but are preferably portions of a single slot defined by a stepped upper edge.

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A coin sorter in accordance with the invention will now be described, by way of example only, with reference to the accompanying schematic drawings in which:-

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Figure 1 is a front elevation of the machine;

Figure 2 is a section on the line 2-2 of Figure 1 and;

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Figure 3 is an enlarged perspective view of a peeler knife.

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In the drawings a coin ramp 1 comprises a coin edge support member 2 and a coin face support plate 3, and the upper end of the ramp is arranged to be fed with coins by a rotatable coin feeding disc 5 which is inclined to the vertical, conveniently at the same angle to the vertical as the plate 3. The disc 5 dips into a hopper or trough into which coins are put for sorting, and in known manner the coins are picked out of the batch of coins and fed to the upper end of ramp 1 for rolling in single file down the ramp 1 with the edge of the coin 10 supported on member 2 and with its rear face supported on plate 3.

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Plate 3 is provided with a longitudinally extending slot 4 defined at its lower edge by the support member 2 and by a multi-stepped upper edge 5 shaped so as to define four (in this example) rectangular slot portions 6, 7, 8 and 9 of heights, measured in the direction normal to the coin edge support surface of member 2, which increase down the ramp. The heights of the slot portions 6, 7, 8 and 9 are chosen such that selected coins will be sorted according to their diameters by falling through the appropriate slot portion. As shown in Figure 2 the coins which fall through one of the slot portions, portion 7 in Figure 2, passes down a respective vertical chute 11 to fall into the rear end of one of the lower coin collection trays or boxes, box 12 in this case. The coin chutes 11 are separated from one another by partition walls 13, three in the example shown, which are positioned at the junction between adjacent portions of the slot 4.

Peeler knives 14, 15, 16 and 17 of conventional curved shape, shown in Figure 3, are mounted as shown on the front of plate 3 at progressively decreasing distances from the member 2 going down the ramp.

In the illustrated example there are four peeler knives 14 to 17, but it will be appreciated that the number of peeler knives does not have to be the same as the number of slot portions 6 to 9.

The four peeler knives 14 to 17 are conveniently positioned each above a respective slot portion 6 to 9 to facilitate the neat, compact assembly of coin boxes shown in which there are two rows of four coin boxes. The peeler knives are arranged in known manner to deflect selected coins from the plate 3 such that they

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topple forwards from the ramp and fall down an inclined chute, such as the chute 18 of Figure 2, to drop into the respective upper coin collection box 19.

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CLAIMS

1. A coin sorter of the kind comprising a ramp (1) which is adapted to be inclined in use and to be fed at its upper end with coins (10) of mixed types such that the coins proceed on edge down a coin edge support surface (2) of the ramp, in which the ramp is provided with a coin face support surface (3) for supporting one face of the coins as the coins proceed down the ramp, the coin face support surface being provided with aperture means comprising aperture portions (6, 7, 8, 9) of different widths in the direction normal to the direction of the coin edge support surface, the widths increasing towards the lower end of the ramp whereby some coins, depending on their diameters in relation to the transverse dimensions of the aperture portions, will fall through the corresponding aperture portions characterised in that the ramp (1) also comprises a plurality of coin deflecting members (14, 15, 16, 17) spaced apart along the ramp and located at different distances from the coin edge support surface (2), the distances decreasing in the direction from the upper end of the ramp to the lower end of the ramp, the coin deflecting members being so arranged that some coins, in dependence on their diameter, engage with the corresponding deflecting member and are deflected away from the coin face support surface to fall from the ramp.

2. A coin sorter as claimed in Claim 1 characterised in that an upper line of coin collection boxes (19) is arranged such that the fronts of the boxes are arranged in line above the fronts of the boxes (12) in a lower line of coin collection boxes, the boxes of the lower line being of greater depth than those of the upper line of boxes, in the horizontal direction normal to

the box fronts, whereby the lower boxes collect the coins which have fallen through the aperture means, and the upper boxes collect the coins which have been displaced from the ramp by the deflecting members, or vice versa.

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3. A coin sorter as claimed in Claim 2 characterised in that each box in the lower line is arranged directly below a box in the upper line.

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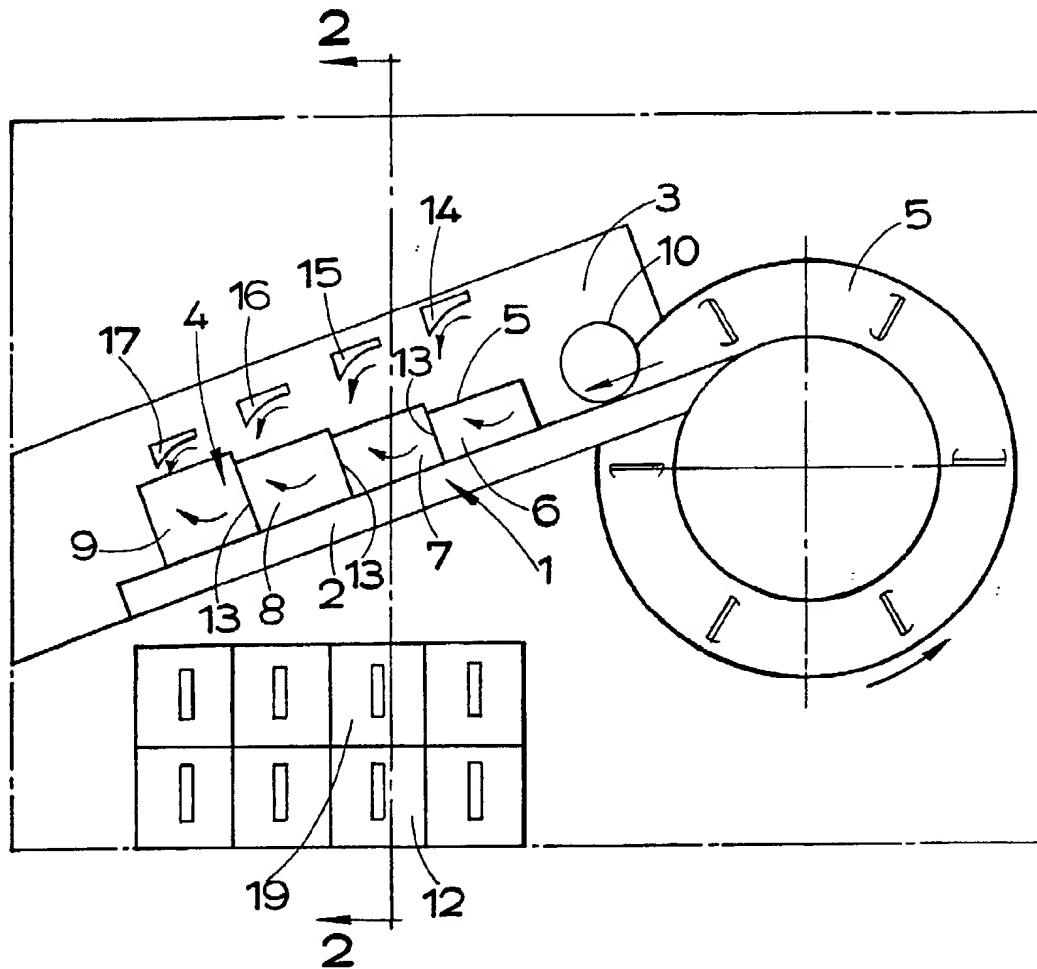


FIG.1.

2/2

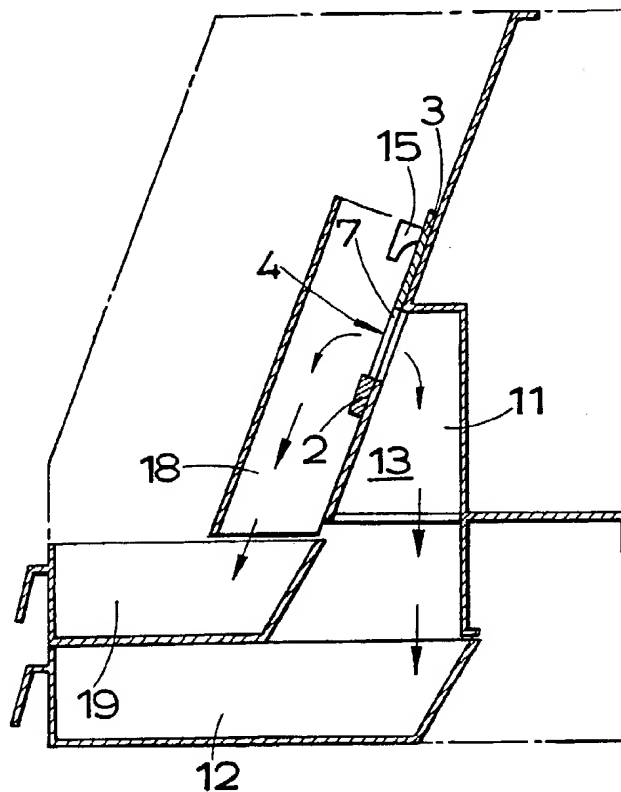


FIG. 2.

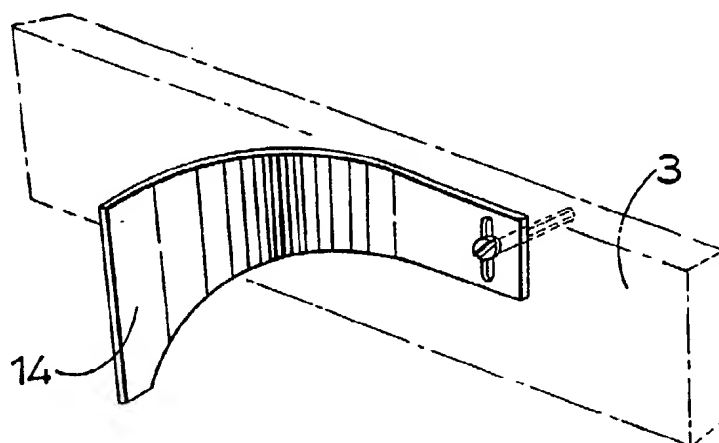
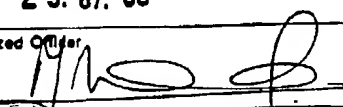


FIG. 3.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 88/00274

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC ⁴ : G 07 D 3/12; G 07 D 3/04		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
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IPC ⁴	G 07 D	
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	EP, A, 0130926 (DUPLESSY) 9 January 1985, see abstract; page 1, lines 1-19; page 2, line 25 - page 3, line 10; page 8, lines 13-28; claims 1,2,4,6; figures 1,2	1
A	--	2,3
A	FR, A, 2383487 (GLORY-KOGYO K.K.) 6 October 1978, see page 2, line 29 - page 3, line 25; page 4, line 28 - page 5, line 9; page 7, line 27 - page 8, line 28; page 10, lines 20-34; claims 1,2; figures 1-3	1-3
A	DE, A, 2655286 (WICKLANDER) 23 June 1977, see claims 1-8; figures 1-3; page 6, line 9 - page 7, line 7	1
A	GB, A, 2039403 (LAUREL-BANK-MACHINE) 6 August 1980, see the whole document	1
<p>* Special categories of cited documents: ¹⁶</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
6th July 1988	25.07.88	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	M. VAN MOL 	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 15/07/88. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A- 0130926	09-01-85	FR-A,B 2546649	30-11-84
		US-A- 4593709	10-06-86
FR-A- 2383487	06-10-78	DE-A,C 2809752	14-09-78
		US-A- 4135529	23-01-79
		JP-A- 53112798	02-10-78
		GB-A- 1598956	30-09-81
DE-A- 2655286	23-06-77	NL-A- 7613883	17-06-77
		GB-A- 1524588	13-09-78
		US-A- 4111215	05-09-78
		CH-A- 610127	30-03-79
		SE-A- 7514135	16-06-77
		SE-B- 394914	18-07-77
GB-A- 2039403	06-08-80	None	